

- Black-footed Cat Working Group -
Report on surveying and catching Black-footed cats (*Felis nigripes*)
on Nuwejaarsfontein Farm / Benfontein Nature Reserve 9-19 November 2009
Alexander Sliwa, Beryl Wilson, Nadine Lamberski, Arne Lawrenz

Introduction:



The Black-footed Cat Working Group (BFCWG) aims to conserve the species by furthering awareness and conducting research on this rare cat by bringing together multidisciplinary expertise to focus on the species' biology. The Group owns a research vehicle (Toyota Hilux) for which the required insurance, running and maintenance costs are administered by the McGregor Museum. The vehicle is used solely for black-footed cat related work. The specialized equipment required for our research is stored at the McGregor Museum, Kimberley. This second trip of the year we worked again in two study areas, from 9th-15th November on

Nuwejaarsfontein, south of De Aar and from 15th-19th November on Benfontein Nature Reserve, near Kimberley.

Study Areas and Project Aims

1 - Benfontein Nature Reserve:

This is a natural heritage site owned by De Beers Consolidated Mines, located 10 km SE of Kimberley on the border of the Northern Cape and Free State Provinces in central South Africa. The majority of the 11.400 ha which consists of arid plant communities has been the subject of the first, and so far only, in-depth field study on the black-footed cat by A. Sliwa in the 1990s. Benfontein receives average annual rainfalls of 450 mm.

2- Nuwejaarsfontein Farm:

Situated 24 km south of De Aar in the Northern Cape Province this sheep and game farm is owned by Sterrie Marais. The BFCWG visited the farm for the first time this year from 7-13th February. The 13.000 ha farm receives an average of 300 mm rain annually and the Karoo plant communities are fenced into 300-400 ha camps both sides of the secondary road parallel to and between the R348 and N10.

This project is part of a multidisciplinary effort to study the distribution, ecology, health, and reproductive status of black-footed cats over an extended period. With the aim of repeatedly capturing black-footed cats for biological sampling, and radio-collaring for subsequent observation, several methods were employed to survey areas, previously known to hold black-footed cats. In 2005, 2006, 2007, 2008, and early 2009 similar capture operations were conducted on Benfontein Nature Reserve. Five reports are available on these periods by the authors and on the website www.wild-cat.org.

Methods:

(A) **Spot-lamp searching:** For 6 nights on Nuwejaarsfontein and 4 nights on Benfontein a 4x4 vehicle (Landrover V8 or 2.4 litre Diesel Toyota Hilux Double cab), drove a route of 20-80 km in length along dirt roads at a speed of 20-30 km/h whilst looking for the characteristic bright eye shine of cats. Optimally two people would stand on the open back of the vehicle operating two spotlights (1 million candle power Lightforce®).

(B) **Catching via searching and pursuit:** Once black-footed cats were located by their eye-shine in the spotlights, their species identity was swiftly confirmed using 10x42 binoculars. If positively identified, they were pursued quickly by vehicle for a short distance, of between 100-600m until the cat squatted low on the ground in front of the stopped vehicle. One or two people with fish landing nets then netted the cats. On other occasions the cats would find a den system (dug by aardvark, ground squirrels or springhares) and were either captured by exposing them after digging, or were lost by the capture team when escaping deeper into the den system. All

accessible cats were subsequently anesthetized with an intramuscular injection of ketamine, medetomidine, midazolam, and butorphanol and covered with a blanket to shield them from lights and sounds. After transporting them back to the research house, all animals were given complete physical examinations, had biological samples collected for disease and genetic studies, morphometric measurements obtained, and radio-collars fitted. The anaesthetic drugs were antagonized with intramuscular atipamezole and naltrexone and the cats then placed in a small plastic crate for recovery. All black-footed cats were released back into a den, close to their capture locations. A blanket was used to cover the den entrance, keeping them inside until they were fit to leave on their own account. There were no complications associated with these procedures and all cats were confirmed alive and well on subsequent nights using telemetry and visual verification.

(C) Digging: This method was not employed this year, as all cats were captured following ground pursuits. It was also not necessary to employ this method on cats with still-functioning radio-collars as only one of the cats collared during the February trip was located through its working radio-collar. That male's ("Okko") collar batteries were still due to last for 10 months and thus didn't need to be replaced. The fate of the other 4 cats is given in detail in the results section below.

(D) Live-trapping: We employed this method for 5 nights on Nuwejaarsfontein using 5 box traps. Nothing was captured in the 25 trapping nights.

The capture via vehicle was conducted and staffed by:

Ms. Beryl Wilson, zoologist, McGregor Museum, South Africa (berylwa@museumsnc.co.za)

Dr. Alexander Sliwa, behavioural ecologist and zoo curator, Cologne (Kölner) Zoo, Germany (sliwa@koelnerzoo.de)

Dr. Nadine Lamberski, veterinary clinical operations manager, San Diego Wild Animal Park, USA (nlamberski@sandiegozoo.org)

Dr. Arne Lawrenz, zoo veterinarian, Wuppertal Zoo, Germany (a.lawrenz@zoo-wuppertal.de)

Mr. Sterrie Marais, farm owner of Nuwejaarsfontein and Taaibosfontein, De Aar (info@karooexperience.co.za)

Mr. Pieter Marais, farm manager of Nuwejaarsfontein and Taaibosfontein, De Aar.

Mr. Theo Pagel, director, Cologne (Kölner) Zoo, Germany (pagel@koelnerzoo.de)

Results:

Trapping:

Nuwejaarsfontein- we ran 5 traps for 5 nights (25 trap-nights) and caught nothing.

Benfontein- we did not conduct any trapping during this trip having been discouraged by previously low trapping success, time and man power constraints.

Spot-lamp searching:

Nuwejaarsfontein- we only saw three different black-footed cats during the 6 nights, all of which we captured on the first attempt. Thus we saw black-footed cats, on average, every second night (50% sighting success rate).

During these night drives we observed other carnivore species such as aardwolves (*Proteles cristatus*), black-backed jackal (*Canis mesomelas*), and several groups of bat-eared foxes (*Otocyon megalotis*). Also seen were Cape foxes (*Vulpes chama*) including a juvenile, armadillo (*Orycteropus afer*) as well as porcupines (*Hystrix africaeaustralis*), and both Cape eagle owl (*Bubo capensis*) and spotted eagle owl (*Bubo africanus*). In contrast to February 2009, on this occasion we did not see any African wildcats (*Felis silvestris lybica*) during our night searches.

Benfontein- we saw two black-footed cats during 4 nights of searching. One was the male "Okko" with the functioning collar on the first night, whom we radio-tracked first thing on the following nights to

avoid pursuing him unnecessarily again. The other was the new adult female “Thea”. Thus we saw black-footed cats unaided by telemetry every second night (50% sighting success rate). The entire area was part of the previous ecological study of Alex Sliwa from 1992-1998, and the same that we searched during previous capture trips. During these night drives we observed other carnivores including aardwolves, different individuals of black-backed jackals (up to 5 per night), Cape fox, and several small groups of bat-eared foxes. Remarkably on two nights we observed a female caracal (*Caracal caracal*) with her three large cubs in almost the same spot, north of the beacon koppie in the panveld. Other nocturnal mammals seen included aardvark and porcupines.

Catching via searching and pursuit:

Nuwejaarsfontein- we caught all three black-footed cats sighted, thus our capture “success” was 3 out of 3 attempts (100%). These included one very large adult male, a younger adult female in good body condition and the older adult female “Ilse” from February with her collar, which had ceased to transmit signals after battery failure. She was exceptionally heavy and due to the condition of her nipples we initially thought that she was about to give birth. The next morning however, Alex Sliwa saw a kitten at the entrance of the den “Ilse” occupied and that evening the whole team saw two kittens at sunset at the same den. These kittens were about 4 weeks of age compared to photo records of Alex from captive kittens and photos published in Olbricht & Sliwa (1995).

Benfontein- out of the 2 sightings that were made we pursued both black-footed cats. We were unable to catch male “Okko” due to strong winds and his evasive tactics. The other sighting resulted in the pursuit and capture of “Thea”. Thus our capture “success” was 1 out of 2 attempts (50%). She showed similar nipple condition to “Ilse” on Nuwejaarsfontein, so we checked her den next morning and heard kittens whimpering from a well concealed den entrance. On the morning of our departure we were able to locate two young kittens still in the same den. These kittens were about 10 days old according to photo records of Alex from captive kittens and photos published in Olbricht & Sliwa (1995). No other cat was sighted, so no population estimates can be given for Benfontein for this November.

Fate of black-footed cats collared in February: One of the previous year’s cats was found dead (male “Jason”), in an advanced state of decay on a road in the sandveld area of Benfontein (Beryl Wilson, 12.09.09). The young adult male “Edwin” could not be located via radio-signal a month after his initial capture and we presumed he has left Benfontein. The collar of a third male (“Pole”) was no longer functioning (already only irregularly in February), and we also did not sight him during this trip. The collar of the female “Ilse” on Nuwejaarsfontein had also stopped working, but she was captured on the 3rd night of spotlight searching.

Locating the radio-collared cats:

Nuwejaarsfontein and Benfontein - subsequent to their respective capture we attempted to acquire location fixes of all radio-marked cats in their dens during daylight each day, and then additional fixes during the course of the nights. Altogether 60 such fixes were obtained for the three cats on Nuwejaarsfontein (Map 1) and the two cats on Benfontein (Map 2), while searching for many hours in vain for those cats missing or with dysfunctional collars. The short duration of the field trip allowed only for the collection of a limited number of fixes, and thus to arrive at incomplete estimated ranges (Table 1). We foresee that through further work by Sterrie and Pieter Marais and by Beryl Wilson following the joint trip, additional location fixes will provide a clearer picture of the ranges.

Behavioural Observations of black-footed cats: Only two cats (“Ilse” and “Okko”) have been followed for several nights previously and thus allowed observation for a few minutes. No unusual behaviours were recorded during these short observation periods. The highlights were certainly the observation of the two sets of kittens at their dens.

Visitors to project: The team was delighted to welcome Theo Pagel (Fig.16), director of the Cologne (Kölner) Zoo for 3 nights to Benfontein. He joined us radio-tracking cats, spotting at night, helped during

Captive Cat rescue: Through the contact of Beryl Wilson the BFCWG visited an animal shelter close to Hartswater, Northern Cape Province, where a female black-footed cat has been held for several months. We anaesthetized the cat for a general health check-up (Fig 18, Table 1) in preparation for a transfer to a breeding centre close to Cradock where black-footed cats have been bred over the past years. This venture could essentially provide a much needed new gene influx into the internationally cooperating breeding programmes for the species. We hope to incorporate such “rescue/animal welfare” components into our goals of the BFCWG, provided there is sufficient funding to cover the high costs of veterinary testing, permits and transport delivery via our field vehicle.

Discussion and Conclusions:

Valuable data on censusing and catching black-footed cats have been collected again on this short trip on Benfontein Nature Reserve, where the species was intensively studied between 1992 -1998. Only two cats were seen or captured and collared during the 4 nights of spotting. The spotting frequency was similar to the previous field trips (see progress reports 2005- Feb. 2009 – downloadable as PDF-files on www.wild-cat.org). The difference to February (2009) trip was that we finally captured another unmarked female on Benfontein that even had kittens. This is encouraging for the black-footed cat population there.

The sighting frequencies between the two study areas during this trip were the same, with one cat sighted every second night of spotting. We assume that the chance of detection was similar between the two sites as both have open habitats with good visibility.

As in previous years on Benfontein we recorded numerous black-backed jackals, while with certainty only one on Nuwejaarsfontein. In addition we observed a reproducing caracal female, with 3 large cubs during this trip. High numbers of both black-backed jackal and caracal may negatively affect black-footed cats densities on Benfontein and may force them to alter their ranging behaviour (see report 2007). We now have quite different conditions in this regard between the two study sites. Strangely, during this trip we did not record African wildcats at Nuwejaarsfontein, in contrast to the 3 different individuals seen in February, which may well benefit the black-footed cats through diminishing competition with this larger felid.

Due to the short time period we spent on Benfontein we will not be able to make a reasonable judgement of the population. There are certainly more than two black-footed cats on Benfontein. The capture of a new and reproducing female is most encouraging. Although she is located close to the N8 highway to Bloemfontein further location records will indicate whether or not she risks crossing this busy road. The longitudinal data on the adult male “Okko” is interesting as he continues to be resident in the north western to south central area for at least the past 3 years. We hope to catch the male “Pole” again on a future trip, as he is the cat we have the longest records for. In February 2009 he had been known to us for 3.5 years.

One hypothesis with the still high jackal and caracal populations is that these species act selectively via predation the smaller, slower, less experienced and thus more vulnerable kittens and female cats than on adult males. It remains to be seen, whether the two kittens of “Thea” survive and how her ranging behaviour develops.

The brevity of the time spent does not allow us to compare estimated range sizes to those of the past years. The range size (1.7 km² 100% Minimum Convex Polygon, N= 9 location fixes) estimated for female “Ilse” on Nuwejaarsfontein during this trip is expected to be also smaller than usual, as during the time when females are suckling kittens their range size is significantly reduced (Molteno, Sliwa & Richardson, 1998). The large male “Berg” on Nuwejaarsfontein (12.7 km² 100% Minimum Convex Polygon, N= 14 location fixes) showed us that within 3 nights, he ranged over a large area, covering the ranges of several females, as is typical for resident males on Benfontein (Sliwa, 2004).

Altogether the trip was very successful, with the capture rate similar to the capture successes obtained during previous field trips. We now also have the secure establishment of a second comparative study area in the Karoo. We continued with our decision to radio-collar any captured cat that was large enough (> 1 kg) in order to get repeated biological samples during future trips and allowing for the comparison of home ranges to the sizes estimated by Sliwa (2004). Beryl Wilson, Sterrie Marais and Pieter Marais will be able to collect more location fixes on a regular basis for each of the five radio-collared cats.

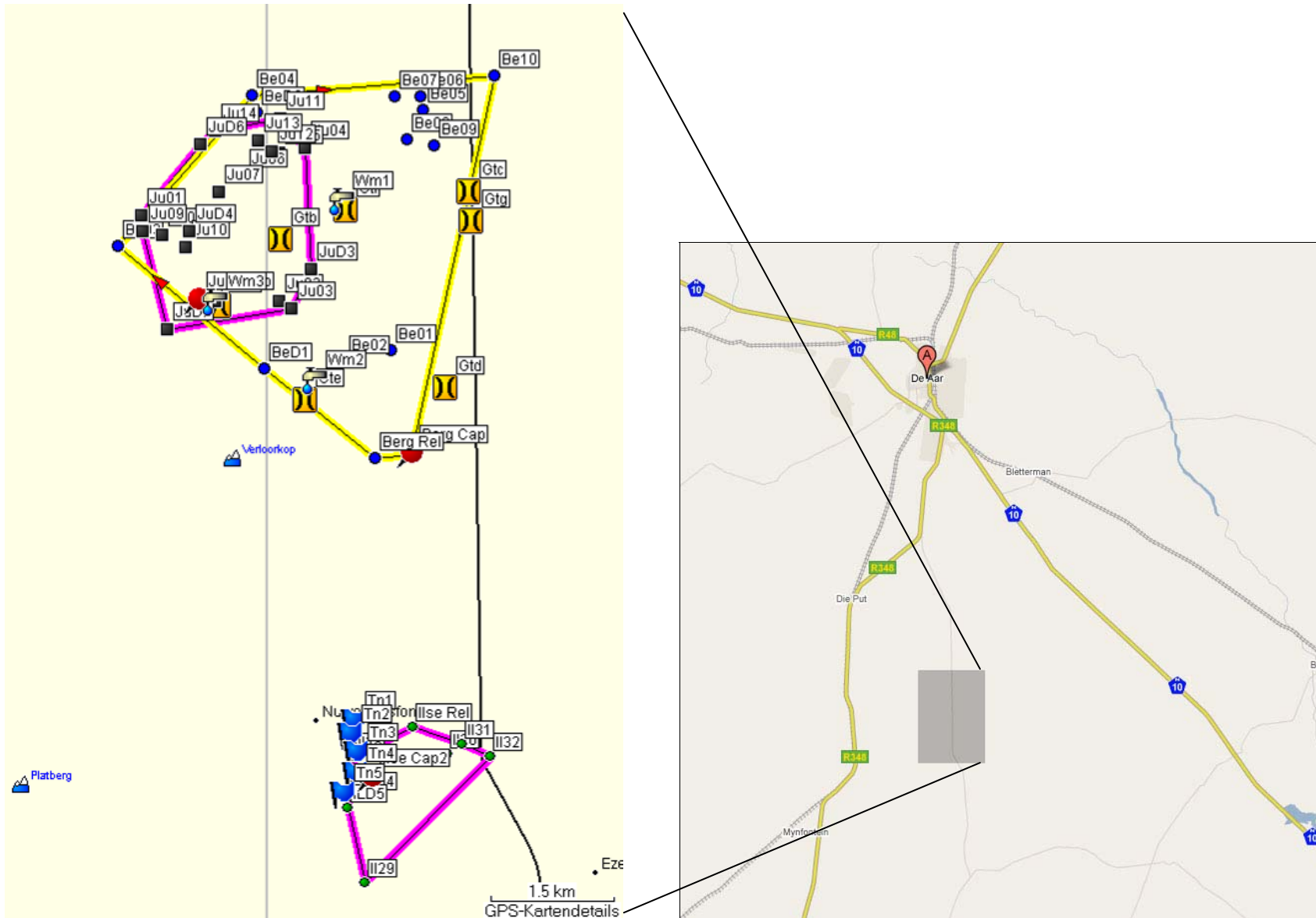
The trapping success has dropped to zero during this admittedly short and low intensity trapping period. The “large predator” lure we used on the traps previously and again during this trip on alternate days might have deterred even the mongooses away from the traps.

We hope to return to Benfontein and Nuwejaarsfontein for further capturing and sampling of wild black-footed cats in 2010.

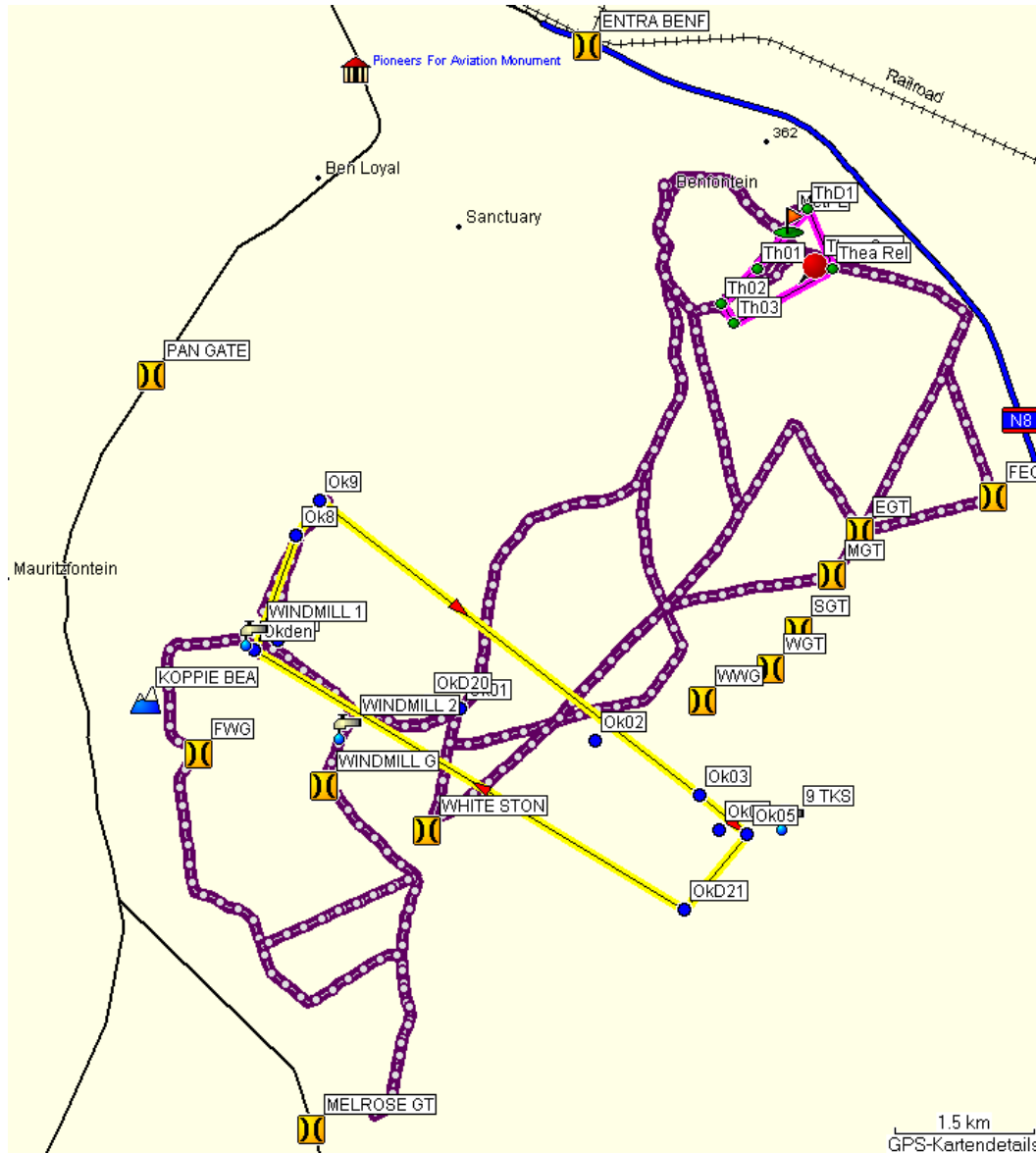
Acknowledgements: We thank Sterrie Marais, his wife Ilse and son Pieter for their holistic support of this capture trip to Nuwejaarsfontein. Not only did Sterrie and Pieter drive and man spotlamps on their excellent Land Rover field vehicle every night, they also helped with the capture and processing of the cats. In addition they covered all the running costs of the vehicle, provided the use of the spotlamps and much needed coffee breaks in the middle of the veld in the late hours of the night. We are especially indebted for their provision of our tranquil, beautiful and comfortable lodging at Taaibosfontein entirely for free! We consider this the most significant South African sponsor contribution to the success of the black-footed cat project! Likewise, we thank De Beers Consolidated Mines for permission to work on Benfontein and the use of the research house for accommodation and lab facilities. Ecology Division of De Beers who gave us permission for the sampling, and supported us in employing the pursuit and live-trapping method. Funds for fieldwork came from Cologne Zoo (dedicated donation by Mr. and Mrs. Stock), Zoo-Verein Wuppertal e.V (friends of the zoo), Wuppertal Zoo, Parc-des Felines, Paris, France; Ebeltoft Zoo (Ree Park), Denmark. San Diego Zoo’s Collection Health Research Initiation Fund, Riverbank’s Zoological Park and Botanical Garden Conservation Support Fund, the *In Situ* Conservation Fund of the Cincinnati Zoo and Botanical Garden, Omaha’s Henry Doorly Zoo, Louisville Zoo and Kansas City Zoo, as well as various scientific tourists to the Benfontein-side of the project. The International Society of Endangered Cats (ISEC) Canada Branch gave generous funds for radio-collars and vehicle running costs. We sincerely thank our respective employers for supporting us and granting us leave of absence from our busy work schedules to carry out this field work.

References:

- Molteno, A.J., Sliwa, A., & Richardson, P.R.K. 1998. The role of scent marking in a free-ranging, female black-footed cat (*Felis nigripes*). *Journal of Zoology (Lond.)* 245: 35-41.
- Olbricht, G. & Sliwa, A. 1995. Comparative development of juvenile black-footed cats at Wuppertal Zoo and elsewhere. *International Studbook for the Black-footed cat (Felis nigripes)*. Wuppertal 1995: 8-20.
- Sliwa, A. 2004. Home range size and social organisation of black-footed cats (*Felis nigripes*). *Mammalian Biology* 69 (2): 96-107.



Map 1. GPS map of Nuwejaarsfontein Farm, with minimum convex polygons of male “Berg” (12,7 km² =100% MCP in yellow joining blue dots), female “Judy” (4,1 km², 100%MCP in magenta, joining black squares), and female “Ilse” (1,7 km², 100% MCP, also in magenta, joining green dots) collected during the field period 9.-15.11.09. Trap positions (blue flags), land marks, windmills and gates, and capture locations (red beacons) of black-footed cats are also shown.



Map 2. GPS map of Benfontein Farm, with minimum convex polygons (100% MCP) encompassing the locations of the 2 radio-collared cats collected during the field period. Male “Okko” = 7,9 km², female “Thea”= 0,6 km², land marks, gates and capture location (red beacon) of the female black-footed cat.



Fig.1. DeAar capture team during a coffee break (Beryl Wilson)



Fig. 2. Alex covering female "Ilse" (Arne Lawrenz)



Fig 3. Nadine with female "Judy" (Beryl Wilson)



Fig 4. Six primate hands on one tiny feline "Ilse" (Alex Sliwa)



Fig 5. Female "Ilse's" nipples
- in use by 2 kittens of ~ 4 weeks (Arne Lawrenz)



Fig. 6. "Ilse's" kittens at sunset, ~ 4 weeks old
(Alex Sliwa)



Fig. 7. Alex checking signal of female "Ilse" in her den
(Nadine Lamberski)



Fig. 8. Female "Judy's" den at sunrise
(Alex Sliwa)



Fig. 9. Arne setting one of the 5 traps we operated
(Nadine Lamberski)



Fig. 10. Beryl driving on Nuwejaarsfontein
(Nadine Lamberski)



Fig. 11. Sterrie Marais and Pieter Marais with "Berg"
(Nadine Lamberski)



Fig. 12. Putting "Berg" into his transport crate for release
(Alex Sliwa)



Fig. 13. Sunset over Nuwejaarsfontein (Alex Sliwa)



Fig 14. Sharing pictures
“that didn’t come out that well” (Alex Sliwa)



Fig. 15. Beryl holding female cat “Thea” (Alex Sliwa)

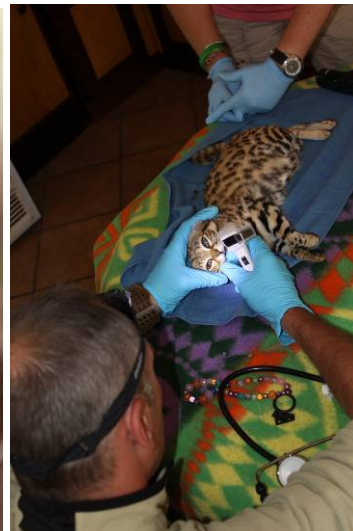


Fig. 16. Theo Pagel holding “Thea”(Alex Sliwa) Fig. 17. “Thea’s” ~10 day old kittens in a den (Alex Sliwa) Fig. 18. Female “Jessie” during her health check by Arne (Alex Sliwa)

Table. 1: Body measurements, range size and remarks on 6 black-footed cats on Nuwejaarsfontein, Benfontein and Hartswater, November 2009.

Date	9.11.09	11.11.09	12.11.09	17.11.09	18.11.09	not captured
Name (also on Map)	Judy	Ilse	Berg	Thea	Jessie	Okko
No. captured	Cat 6 09	Cat 7 09	Cat 8 09	Cat 9 09	/	/
Sex	F	F	M	F	F	M
Age	adult	adult	adult	kitten	adult	Adult
Microchip #.	TRV 00-06C66-ODE	TVN 00-0689-5136	TVN 00-6CAC-33K	TVN 00-06C5-FE2	TVN 00-0689-7407	TRV
Mass (kg)	1,10	1,35	2,10	1,20	1,72	/
Ear (cm)	4,60	/	5,00	4,5/	5,20	/
Shoulder (cm)	26,00	/	27,00	18,00	26	/
Total Length (cm)	55,00	/	64,00	54,00	60,5	/
Hind foot (cm)	8,2	/	10,1	8,50	9,5	/
Front foot (cm)	1,80	/	2,20	1,90	2,00	/
Tail (cm)	15,00	/	20,00	16,00	18,00	/
Neck (cm)	10,00	/	14,50	11,50	13,00	/
Canine UR (cm)	0,90	/	1,00	0,88	0,93	/
Canine LR (cm)	0,74	/	0,88	0,74	0,82	/
Canine UL (cm)	0,88	/	1,00	0,80	0,90	/
Canine LL (cm)	0,76	/	0,82	0,70	0,83	/
Testes RL (cm)	/	/	/	/	1,10	/
Testes RW (cm)	/	/	/	/	1,00	/
Testes LL (cm)	/	/	/	/	1,25	/
Testes LW (cm)	/	/	/	/	0,90	/
Number of fixes	20	9	14	6	/	11
Range size (100%)	4,1 km ²	1,7 km ²	12,7 km ²	0,6 km ²	/	7,9 km ²

REMARKS

Judy Cat 6 09 Adult female, not captured before, some fleas, **Nuwejaarsfontein, radio-collared**

Ilse Cat 7 09 Adult female, recaptured from Feb09, good condition, had just eaten a lot!, lactating – had 2 kittens ~4 weeks old, little tartar on M¹, 2 central incisors missing in each jaw (8 missing), **Nuwejaarsfontein, radio-collared**, not measured for not stressing her for too long

Berg Cat 8 09 Adult male, captured on **Nuwejaarsfontein**, very large, excellent condition, some plaque, probably the dominant territorial male, **radio-collared**

Thea Cat 9 09 Adult female, captured on **Benfontein**, lactating - 2 kittens ~10 days old - just opened eyes; she had clean, unchipped teeth, **radio-collared**

Jessie Adult female, captive at Hartswater, overweight from feeding on tinned cat food, blood samples taken for transfer to other captive holding

Okko Adult male, collar still working from collaring in Feb 2009, battery should last until April 2010, thus only radio tracked